

# Assignment By

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- PGD Batch-05

## Multi-Layer Perceptron

```
In [ ]: import os
import warnings
warnings.filterwarnings('ignore')

# Suppress TensorFlow warnings
os.environ['TF_CPP_MIN_LOG_LEVEL'] = '3'

import tensorflow as tf
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
import pandas as pd
import seaborn as sns

# Load tips dataset
tips = sns.load_dataset('tips')

# Preprocessing
# Converting categorical variables to dummy variables
tips = pd.get_dummies(tips, drop_first=True)

# Selecting features and target (predicting 'tip' based on other features)
X = tips.drop('tip', axis=1)
y = tips['tip']

# Splitting the dataset
X_train, X_test, y_train, y_test = train_test_split(X, y,
                                                    test_size=0.2,
                                                    random_state=42) # Fixed Random State: Train Data is fixed.

# Standardizing the data
scaler = StandardScaler()
X_train = scaler.fit_transform(X_train)
X_test = scaler.transform(X_test)
```

```
# Building the model
model = tf.keras.models.Sequential([
    tf.keras.layers.Dense(64, activation='relu',
                         input_shape=(X_train.shape[1],)), # Input Layer
                                         # 64 > Number of Neurons

    tf.keras.layers.Dense(32, activation='relu'), # Hidden Layer

    tf.keras.layers.Dense(1) # Output Layer for regression
                           # Linear Activation Function is used for Regression Function (Which is By Default)
])

# Compile the model
model.compile(optimizer='adam', loss='mean_squared_error', metrics=['mae'])

# Training the model
model.fit(X_train, y_train, epochs=500, batch_size=32, verbose=1)

# Evaluating the model (using Mean Squared Error)
loss = model.evaluate(X_test, y_test, verbose=0)
print('Mean Squared Error: ', loss[0])
print('Accuracy: ', loss[1] )
```

Epoch 1/500  
7/7 [=====] - 1s 4ms/step - loss: 9.2365 - mae: 2.7365  
Epoch 2/500  
7/7 [=====] - 0s 5ms/step - loss: 6.6416 - mae: 2.2346  
Epoch 3/500  
7/7 [=====] - 0s 4ms/step - loss: 4.6373 - mae: 1.7747  
Epoch 4/500  
7/7 [=====] - 0s 5ms/step - loss: 3.1264 - mae: 1.3614  
Epoch 5/500  
7/7 [=====] - 0s 4ms/step - loss: 2.1221 - mae: 1.0647  
Epoch 6/500  
7/7 [=====] - 0s 4ms/step - loss: 1.5785 - mae: 0.9086  
Epoch 7/500  
7/7 [=====] - 0s 4ms/step - loss: 1.3275 - mae: 0.8686  
Epoch 8/500  
7/7 [=====] - 0s 4ms/step - loss: 1.2387 - mae: 0.8724  
Epoch 9/500  
7/7 [=====] - 0s 5ms/step - loss: 1.1933 - mae: 0.8500  
Epoch 10/500  
7/7 [=====] - 0s 4ms/step - loss: 1.1395 - mae: 0.8196  
Epoch 11/500  
7/7 [=====] - 0s 4ms/step - loss: 1.1135 - mae: 0.8041  
Epoch 12/500  
7/7 [=====] - 0s 4ms/step - loss: 1.0859 - mae: 0.7908  
Epoch 13/500  
7/7 [=====] - 0s 4ms/step - loss: 1.0619 - mae: 0.7782  
Epoch 14/500  
7/7 [=====] - 0s 3ms/step - loss: 1.0323 - mae: 0.7661  
Epoch 15/500  
7/7 [=====] - 0s 3ms/step - loss: 1.0202 - mae: 0.7593  
Epoch 16/500  
7/7 [=====] - 0s 4ms/step - loss: 1.0072 - mae: 0.7542  
Epoch 17/500  
7/7 [=====] - 0s 4ms/step - loss: 1.0031 - mae: 0.7495  
Epoch 18/500  
7/7 [=====] - 0s 4ms/step - loss: 0.9872 - mae: 0.7448  
Epoch 19/500  
7/7 [=====] - 0s 4ms/step - loss: 0.9871 - mae: 0.7449  
Epoch 20/500  
7/7 [=====] - 0s 4ms/step - loss: 0.9640 - mae: 0.7371  
Epoch 21/500  
7/7 [=====] - 0s 4ms/step - loss: 0.9539 - mae: 0.7286  
Epoch 22/500  
7/7 [=====] - 0s 4ms/step - loss: 0.9415 - mae: 0.7223  
Epoch 23/500  
7/7 [=====] - 0s 4ms/step - loss: 0.9319 - mae: 0.7193

Epoch 24/500  
7/7 [=====] - 0s 4ms/step - loss: 0.9324 - mae: 0.7182  
Epoch 25/500  
7/7 [=====] - 0s 5ms/step - loss: 0.9176 - mae: 0.7117  
Epoch 26/500  
7/7 [=====] - 0s 6ms/step - loss: 0.9115 - mae: 0.7101  
Epoch 27/500  
7/7 [=====] - 0s 4ms/step - loss: 0.9009 - mae: 0.7072  
Epoch 28/500  
7/7 [=====] - 0s 5ms/step - loss: 0.8951 - mae: 0.7038  
Epoch 29/500  
7/7 [=====] - 0s 5ms/step - loss: 0.8907 - mae: 0.7016  
Epoch 30/500  
7/7 [=====] - 0s 4ms/step - loss: 0.8803 - mae: 0.6980  
Epoch 31/500  
7/7 [=====] - 0s 3ms/step - loss: 0.8733 - mae: 0.6953  
Epoch 32/500  
7/7 [=====] - 0s 3ms/step - loss: 0.8653 - mae: 0.6916  
Epoch 33/500  
7/7 [=====] - 0s 3ms/step - loss: 0.8608 - mae: 0.6908  
Epoch 34/500  
7/7 [=====] - 0s 4ms/step - loss: 0.8537 - mae: 0.6864  
Epoch 35/500  
7/7 [=====] - 0s 3ms/step - loss: 0.8496 - mae: 0.6821  
Epoch 36/500  
7/7 [=====] - 0s 3ms/step - loss: 0.8452 - mae: 0.6786  
Epoch 37/500  
7/7 [=====] - 0s 3ms/step - loss: 0.8354 - mae: 0.6763  
Epoch 38/500  
7/7 [=====] - 0s 4ms/step - loss: 0.8305 - mae: 0.6722  
Epoch 39/500  
7/7 [=====] - 0s 3ms/step - loss: 0.8363 - mae: 0.6775  
Epoch 40/500  
7/7 [=====] - 0s 4ms/step - loss: 0.8321 - mae: 0.6730  
Epoch 41/500  
7/7 [=====] - 0s 3ms/step - loss: 0.8301 - mae: 0.6719  
Epoch 42/500  
7/7 [=====] - 0s 3ms/step - loss: 0.8213 - mae: 0.6678  
Epoch 43/500  
7/7 [=====] - 0s 3ms/step - loss: 0.8112 - mae: 0.6654  
Epoch 44/500  
7/7 [=====] - 0s 3ms/step - loss: 0.8053 - mae: 0.6616  
Epoch 45/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7984 - mae: 0.6588  
Epoch 46/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7932 - mae: 0.6574

Epoch 47/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7865 - mae: 0.6548  
Epoch 48/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7857 - mae: 0.6511  
Epoch 49/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7843 - mae: 0.6512  
Epoch 50/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7809 - mae: 0.6505  
Epoch 51/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7784 - mae: 0.6462  
Epoch 52/500  
7/7 [=====] - 0s 5ms/step - loss: 0.7775 - mae: 0.6460  
Epoch 53/500  
7/7 [=====] - 0s 4ms/step - loss: 0.7710 - mae: 0.6442  
Epoch 54/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7637 - mae: 0.6431  
Epoch 55/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7638 - mae: 0.6447  
Epoch 56/500  
7/7 [=====] - 0s 4ms/step - loss: 0.7573 - mae: 0.6437  
Epoch 57/500  
7/7 [=====] - 0s 4ms/step - loss: 0.7529 - mae: 0.6375  
Epoch 58/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7471 - mae: 0.6337  
Epoch 59/500  
7/7 [=====] - 0s 4ms/step - loss: 0.7481 - mae: 0.6292  
Epoch 60/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7578 - mae: 0.6298  
Epoch 61/500  
7/7 [=====] - 0s 4ms/step - loss: 0.7572 - mae: 0.6331  
Epoch 62/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7482 - mae: 0.6326  
Epoch 63/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7435 - mae: 0.6313  
Epoch 64/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7407 - mae: 0.6307  
Epoch 65/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7473 - mae: 0.6423  
Epoch 66/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7497 - mae: 0.6405  
Epoch 67/500  
7/7 [=====] - 0s 4ms/step - loss: 0.7207 - mae: 0.6226  
Epoch 68/500  
7/7 [=====] - 0s 4ms/step - loss: 0.7208 - mae: 0.6164  
Epoch 69/500  
7/7 [=====] - 0s 4ms/step - loss: 0.7235 - mae: 0.6167

Epoch 70/500  
7/7 [=====] - 0s 4ms/step - loss: 0.7149 - mae: 0.6150  
Epoch 71/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7072 - mae: 0.6125  
Epoch 72/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7078 - mae: 0.6153  
Epoch 73/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7060 - mae: 0.6098  
Epoch 74/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7034 - mae: 0.6064  
Epoch 75/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7059 - mae: 0.6101  
Epoch 76/500  
7/7 [=====] - 0s 3ms/step - loss: 0.7004 - mae: 0.6097  
Epoch 77/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6955 - mae: 0.6082  
Epoch 78/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6976 - mae: 0.6072  
Epoch 79/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6968 - mae: 0.6080  
Epoch 80/500  
7/7 [=====] - 0s 5ms/step - loss: 0.6953 - mae: 0.6087  
Epoch 81/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6889 - mae: 0.6058  
Epoch 82/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6862 - mae: 0.6016  
Epoch 83/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6779 - mae: 0.5937  
Epoch 84/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6795 - mae: 0.5965  
Epoch 85/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6732 - mae: 0.5947  
Epoch 86/500  
7/7 [=====] - 0s 5ms/step - loss: 0.6705 - mae: 0.5948  
Epoch 87/500  
7/7 [=====] - 0s 6ms/step - loss: 0.6700 - mae: 0.5956  
Epoch 88/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6758 - mae: 0.5982  
Epoch 89/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6679 - mae: 0.5918  
Epoch 90/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6702 - mae: 0.5972  
Epoch 91/500  
7/7 [=====] - 0s 5ms/step - loss: 0.6646 - mae: 0.5934  
Epoch 92/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6791 - mae: 0.5917

Epoch 93/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6737 - mae: 0.5886  
Epoch 94/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6621 - mae: 0.5852  
Epoch 95/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6582 - mae: 0.5866  
Epoch 96/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6591 - mae: 0.5874  
Epoch 97/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6614 - mae: 0.5859  
Epoch 98/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6538 - mae: 0.5811  
Epoch 99/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6533 - mae: 0.5821  
Epoch 100/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6498 - mae: 0.5824  
Epoch 101/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6658 - mae: 0.6005  
Epoch 102/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6897 - mae: 0.6134  
Epoch 103/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6622 - mae: 0.5913  
Epoch 104/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6608 - mae: 0.5862  
Epoch 105/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6474 - mae: 0.5840  
Epoch 106/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6544 - mae: 0.5936  
Epoch 107/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6595 - mae: 0.5997  
Epoch 108/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6400 - mae: 0.5856  
Epoch 109/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6382 - mae: 0.5769  
Epoch 110/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6270 - mae: 0.5693  
Epoch 111/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6304 - mae: 0.5744  
Epoch 112/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6450 - mae: 0.5867  
Epoch 113/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6363 - mae: 0.5836  
Epoch 114/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6221 - mae: 0.5736  
Epoch 115/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6221 - mae: 0.5735

Epoch 116/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6243 - mae: 0.5698  
Epoch 117/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6273 - mae: 0.5697  
Epoch 118/500  
7/7 [=====] - 0s 5ms/step - loss: 0.6135 - mae: 0.5641  
Epoch 119/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6468 - mae: 0.5916  
Epoch 120/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6598 - mae: 0.5935  
Epoch 121/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6379 - mae: 0.5781  
Epoch 122/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6264 - mae: 0.5748  
Epoch 123/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6241 - mae: 0.5763  
Epoch 124/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6161 - mae: 0.5735  
Epoch 125/500  
7/7 [=====] - 0s 4ms/step - loss: 0.6022 - mae: 0.5667  
Epoch 126/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5990 - mae: 0.5642  
Epoch 127/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5976 - mae: 0.5612  
Epoch 128/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5928 - mae: 0.5555  
Epoch 129/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5961 - mae: 0.5551  
Epoch 130/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5994 - mae: 0.5618  
Epoch 131/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5976 - mae: 0.5584  
Epoch 132/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5958 - mae: 0.5559  
Epoch 133/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5878 - mae: 0.5514  
Epoch 134/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5853 - mae: 0.5534  
Epoch 135/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5827 - mae: 0.5523  
Epoch 136/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6015 - mae: 0.5617  
Epoch 137/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6072 - mae: 0.5600  
Epoch 138/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6011 - mae: 0.5528

Epoch 139/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5817 - mae: 0.5477  
Epoch 140/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5806 - mae: 0.5508  
Epoch 141/500  
7/7 [=====] - 0s 5ms/step - loss: 0.5758 - mae: 0.5513  
Epoch 142/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5772 - mae: 0.5530  
Epoch 143/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5709 - mae: 0.5480  
Epoch 144/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5832 - mae: 0.5559  
Epoch 145/500  
7/7 [=====] - 0s 3ms/step - loss: 0.6058 - mae: 0.5633  
Epoch 146/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5896 - mae: 0.5508  
Epoch 147/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5761 - mae: 0.5437  
Epoch 148/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5720 - mae: 0.5453  
Epoch 149/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5655 - mae: 0.5423  
Epoch 150/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5637 - mae: 0.5380  
Epoch 151/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5641 - mae: 0.5399  
Epoch 152/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5625 - mae: 0.5399  
Epoch 153/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5581 - mae: 0.5381  
Epoch 154/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5543 - mae: 0.5343  
Epoch 155/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5549 - mae: 0.5437  
Epoch 156/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5566 - mae: 0.5471  
Epoch 157/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5600 - mae: 0.5453  
Epoch 158/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5540 - mae: 0.5443  
Epoch 159/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5530 - mae: 0.5397  
Epoch 160/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5576 - mae: 0.5335  
Epoch 161/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5586 - mae: 0.5332

Epoch 162/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5580 - mae: 0.5370  
Epoch 163/500  
7/7 [=====] - 0s 5ms/step - loss: 0.5607 - mae: 0.5415  
Epoch 164/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5528 - mae: 0.5444  
Epoch 165/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5489 - mae: 0.5391  
Epoch 166/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5509 - mae: 0.5337  
Epoch 167/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5489 - mae: 0.5290  
Epoch 168/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5379 - mae: 0.5273  
Epoch 169/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5352 - mae: 0.5349  
Epoch 170/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5550 - mae: 0.5501  
Epoch 171/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5601 - mae: 0.5533  
Epoch 172/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5467 - mae: 0.5353  
Epoch 173/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5335 - mae: 0.5265  
Epoch 174/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5407 - mae: 0.5264  
Epoch 175/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5408 - mae: 0.5285  
Epoch 176/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5424 - mae: 0.5298  
Epoch 177/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5734 - mae: 0.5455  
Epoch 178/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5723 - mae: 0.5528  
Epoch 179/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5467 - mae: 0.5395  
Epoch 180/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5300 - mae: 0.5344  
Epoch 181/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5342 - mae: 0.5286  
Epoch 182/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5279 - mae: 0.5264  
Epoch 183/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5242 - mae: 0.5257  
Epoch 184/500  
7/7 [=====] - 0s 5ms/step - loss: 0.5211 - mae: 0.5230

Epoch 185/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5227 - mae: 0.5250  
Epoch 186/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5359 - mae: 0.5352  
Epoch 187/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5240 - mae: 0.5244  
Epoch 188/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5122 - mae: 0.5165  
Epoch 189/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5141 - mae: 0.5165  
Epoch 190/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5086 - mae: 0.5158  
Epoch 191/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5049 - mae: 0.5145  
Epoch 192/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5062 - mae: 0.5130  
Epoch 193/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5076 - mae: 0.5151  
Epoch 194/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5001 - mae: 0.5092  
Epoch 195/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5053 - mae: 0.5116  
Epoch 196/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5022 - mae: 0.5144  
Epoch 197/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5132 - mae: 0.5189  
Epoch 198/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5024 - mae: 0.5129  
Epoch 199/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5014 - mae: 0.5130  
Epoch 200/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5124 - mae: 0.5386  
Epoch 201/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5381 - mae: 0.5486  
Epoch 202/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5299 - mae: 0.5360  
Epoch 203/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5127 - mae: 0.5232  
Epoch 204/500  
7/7 [=====] - 0s 4ms/step - loss: 0.5088 - mae: 0.5225  
Epoch 205/500  
7/7 [=====] - 0s 5ms/step - loss: 0.5113 - mae: 0.5259  
Epoch 206/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5115 - mae: 0.5234  
Epoch 207/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5017 - mae: 0.5167

Epoch 208/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4956 - mae: 0.5064  
Epoch 209/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4936 - mae: 0.5128  
Epoch 210/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5007 - mae: 0.5192  
Epoch 211/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4888 - mae: 0.5055  
Epoch 212/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4888 - mae: 0.5169  
Epoch 213/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5245 - mae: 0.5458  
Epoch 214/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5077 - mae: 0.5283  
Epoch 215/500  
7/7 [=====] - 0s 3ms/step - loss: 0.5037 - mae: 0.5241  
Epoch 216/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4898 - mae: 0.5148  
Epoch 217/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4904 - mae: 0.5163  
Epoch 218/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4773 - mae: 0.5086  
Epoch 219/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4793 - mae: 0.5138  
Epoch 220/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4775 - mae: 0.5099  
Epoch 221/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4832 - mae: 0.5144  
Epoch 222/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4856 - mae: 0.5134  
Epoch 223/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4917 - mae: 0.5143  
Epoch 224/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4771 - mae: 0.5018  
Epoch 225/500  
7/7 [=====] - 0s 5ms/step - loss: 0.4787 - mae: 0.5002  
Epoch 226/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4701 - mae: 0.5038  
Epoch 227/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4829 - mae: 0.5172  
Epoch 228/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4723 - mae: 0.5042  
Epoch 229/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4717 - mae: 0.5011  
Epoch 230/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4689 - mae: 0.4975

Epoch 231/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4791 - mae: 0.5054  
Epoch 232/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4550 - mae: 0.4933  
Epoch 233/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4681 - mae: 0.4971  
Epoch 234/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4632 - mae: 0.4931  
Epoch 235/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4611 - mae: 0.4912  
Epoch 236/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4616 - mae: 0.4944  
Epoch 237/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4556 - mae: 0.4927  
Epoch 238/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4551 - mae: 0.4938  
Epoch 239/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4561 - mae: 0.4921  
Epoch 240/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4723 - mae: 0.5033  
Epoch 241/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4747 - mae: 0.5068  
Epoch 242/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4636 - mae: 0.5033  
Epoch 243/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4515 - mae: 0.4950  
Epoch 244/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4529 - mae: 0.4928  
Epoch 245/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4497 - mae: 0.4937  
Epoch 246/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4563 - mae: 0.4906  
Epoch 247/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4621 - mae: 0.4991  
Epoch 248/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4625 - mae: 0.4994  
Epoch 249/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4553 - mae: 0.4961  
Epoch 250/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4555 - mae: 0.4998  
Epoch 251/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4529 - mae: 0.4946  
Epoch 252/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4496 - mae: 0.4900  
Epoch 253/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4511 - mae: 0.4920

Epoch 254/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4632 - mae: 0.4975  
Epoch 255/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4635 - mae: 0.4969  
Epoch 256/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4504 - mae: 0.4886  
Epoch 257/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4402 - mae: 0.4852  
Epoch 258/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4432 - mae: 0.4876  
Epoch 259/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4459 - mae: 0.4890  
Epoch 260/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4435 - mae: 0.4875  
Epoch 261/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4371 - mae: 0.4865  
Epoch 262/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4350 - mae: 0.4857  
Epoch 263/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4308 - mae: 0.4803  
Epoch 264/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4351 - mae: 0.4839  
Epoch 265/500  
7/7 [=====] - 0s 5ms/step - loss: 0.4376 - mae: 0.4865  
Epoch 266/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4322 - mae: 0.4831  
Epoch 267/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4304 - mae: 0.4796  
Epoch 268/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4366 - mae: 0.4842  
Epoch 269/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4278 - mae: 0.4767  
Epoch 270/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4438 - mae: 0.4815  
Epoch 271/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4231 - mae: 0.4695  
Epoch 272/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4318 - mae: 0.4800  
Epoch 273/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4369 - mae: 0.4829  
Epoch 274/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4350 - mae: 0.4857  
Epoch 275/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4406 - mae: 0.4884  
Epoch 276/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4426 - mae: 0.4848

Epoch 277/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4389 - mae: 0.4803  
Epoch 278/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4246 - mae: 0.4719  
Epoch 279/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4323 - mae: 0.4838  
Epoch 280/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4290 - mae: 0.4808  
Epoch 281/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4343 - mae: 0.4866  
Epoch 282/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4304 - mae: 0.4821  
Epoch 283/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4222 - mae: 0.4729  
Epoch 284/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4209 - mae: 0.4749  
Epoch 285/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4165 - mae: 0.4734  
Epoch 286/500  
7/7 [=====] - 0s 6ms/step - loss: 0.4186 - mae: 0.4703  
Epoch 287/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4180 - mae: 0.4682  
Epoch 288/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4143 - mae: 0.4702  
Epoch 289/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4209 - mae: 0.4767  
Epoch 290/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4152 - mae: 0.4698  
Epoch 291/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4342 - mae: 0.4827  
Epoch 292/500  
7/7 [=====] - 0s 5ms/step - loss: 0.4422 - mae: 0.4799  
Epoch 293/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4397 - mae: 0.4855  
Epoch 294/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4421 - mae: 0.4975  
Epoch 295/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4276 - mae: 0.4849  
Epoch 296/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4166 - mae: 0.4676  
Epoch 297/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4226 - mae: 0.4736  
Epoch 298/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4199 - mae: 0.4721  
Epoch 299/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4153 - mae: 0.4632

Epoch 300/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4023 - mae: 0.4578  
Epoch 301/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4228 - mae: 0.4789  
Epoch 302/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4189 - mae: 0.4810  
Epoch 303/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4421 - mae: 0.4956  
Epoch 304/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4203 - mae: 0.4757  
Epoch 305/500  
7/7 [=====] - 0s 5ms/step - loss: 0.4047 - mae: 0.4658  
Epoch 306/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4090 - mae: 0.4718  
Epoch 307/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4010 - mae: 0.4658  
Epoch 308/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3978 - mae: 0.4655  
Epoch 309/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3951 - mae: 0.4604  
Epoch 310/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3958 - mae: 0.4607  
Epoch 311/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3938 - mae: 0.4601  
Epoch 312/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4341 - mae: 0.4961  
Epoch 313/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4508 - mae: 0.5110  
Epoch 314/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4305 - mae: 0.4861  
Epoch 315/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4073 - mae: 0.4748  
Epoch 316/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4117 - mae: 0.4737  
Epoch 317/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4133 - mae: 0.4728  
Epoch 318/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4095 - mae: 0.4769  
Epoch 319/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3881 - mae: 0.4560  
Epoch 320/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3994 - mae: 0.4724  
Epoch 321/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3980 - mae: 0.4675  
Epoch 322/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3888 - mae: 0.4617

Epoch 323/500  
7/7 [=====] - 0s 6ms/step - loss: 0.3845 - mae: 0.4578  
Epoch 324/500  
7/7 [=====] - 0s 3ms/step - loss: 0.4355 - mae: 0.4878  
Epoch 325/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4253 - mae: 0.4841  
Epoch 326/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4329 - mae: 0.5019  
Epoch 327/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4223 - mae: 0.4900  
Epoch 328/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4069 - mae: 0.4818  
Epoch 329/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3948 - mae: 0.4675  
Epoch 330/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3900 - mae: 0.4608  
Epoch 331/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3828 - mae: 0.4585  
Epoch 332/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3816 - mae: 0.4580  
Epoch 333/500  
7/7 [=====] - 0s 5ms/step - loss: 0.3775 - mae: 0.4533  
Epoch 334/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3952 - mae: 0.4658  
Epoch 335/500  
7/7 [=====] - 0s 4ms/step - loss: 0.4124 - mae: 0.4717  
Epoch 336/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3931 - mae: 0.4627  
Epoch 337/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3809 - mae: 0.4518  
Epoch 338/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3841 - mae: 0.4528  
Epoch 339/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3833 - mae: 0.4599  
Epoch 340/500  
7/7 [=====] - 0s 5ms/step - loss: 0.3883 - mae: 0.4625  
Epoch 341/500  
7/7 [=====] - 0s 5ms/step - loss: 0.3767 - mae: 0.4576  
Epoch 342/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3687 - mae: 0.4479  
Epoch 343/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3699 - mae: 0.4444  
Epoch 344/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3697 - mae: 0.4429  
Epoch 345/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3768 - mae: 0.4482

Epoch 346/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3783 - mae: 0.4499  
Epoch 347/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3643 - mae: 0.4406  
Epoch 348/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3658 - mae: 0.4416  
Epoch 349/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3632 - mae: 0.4373  
Epoch 350/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3654 - mae: 0.4410  
Epoch 351/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3623 - mae: 0.4405  
Epoch 352/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3610 - mae: 0.4453  
Epoch 353/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3621 - mae: 0.4461  
Epoch 354/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3796 - mae: 0.4592  
Epoch 355/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3861 - mae: 0.4697  
Epoch 356/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3711 - mae: 0.4557  
Epoch 357/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3943 - mae: 0.4701  
Epoch 358/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3735 - mae: 0.4621  
Epoch 359/500  
7/7 [=====] - 0s 6ms/step - loss: 0.3791 - mae: 0.4619  
Epoch 360/500  
7/7 [=====] - 0s 5ms/step - loss: 0.3577 - mae: 0.4423  
Epoch 361/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3526 - mae: 0.4397  
Epoch 362/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3568 - mae: 0.4395  
Epoch 363/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3646 - mae: 0.4480  
Epoch 364/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3819 - mae: 0.4587  
Epoch 365/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3869 - mae: 0.4526  
Epoch 366/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3712 - mae: 0.4477  
Epoch 367/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3722 - mae: 0.4581  
Epoch 368/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3678 - mae: 0.4504

Epoch 369/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3673 - mae: 0.4462  
Epoch 370/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3618 - mae: 0.4450  
Epoch 371/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3512 - mae: 0.4376  
Epoch 372/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3682 - mae: 0.4385  
Epoch 373/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3612 - mae: 0.4379  
Epoch 374/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3540 - mae: 0.4373  
Epoch 375/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3529 - mae: 0.4369  
Epoch 376/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3559 - mae: 0.4432  
Epoch 377/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3581 - mae: 0.4425  
Epoch 378/500  
7/7 [=====] - 0s 6ms/step - loss: 0.3539 - mae: 0.4428  
Epoch 379/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3720 - mae: 0.4501  
Epoch 380/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3552 - mae: 0.4334  
Epoch 381/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3475 - mae: 0.4255  
Epoch 382/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3472 - mae: 0.4279  
Epoch 383/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3502 - mae: 0.4396  
Epoch 384/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3599 - mae: 0.4495  
Epoch 385/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3492 - mae: 0.4368  
Epoch 386/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3378 - mae: 0.4271  
Epoch 387/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3373 - mae: 0.4255  
Epoch 388/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3431 - mae: 0.4281  
Epoch 389/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3435 - mae: 0.4299  
Epoch 390/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3396 - mae: 0.4282  
Epoch 391/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3422 - mae: 0.4256

Epoch 392/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3485 - mae: 0.4292  
Epoch 393/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3403 - mae: 0.4248  
Epoch 394/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3386 - mae: 0.4199  
Epoch 395/500  
7/7 [=====] - 0s 6ms/step - loss: 0.3379 - mae: 0.4171  
Epoch 396/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3346 - mae: 0.4154  
Epoch 397/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3363 - mae: 0.4181  
Epoch 398/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3370 - mae: 0.4216  
Epoch 399/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3372 - mae: 0.4235  
Epoch 400/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3299 - mae: 0.4226  
Epoch 401/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3428 - mae: 0.4352  
Epoch 402/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3390 - mae: 0.4344  
Epoch 403/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3429 - mae: 0.4372  
Epoch 404/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3376 - mae: 0.4304  
Epoch 405/500  
7/7 [=====] - 0s 5ms/step - loss: 0.3364 - mae: 0.4296  
Epoch 406/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3332 - mae: 0.4297  
Epoch 407/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3343 - mae: 0.4275  
Epoch 408/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3398 - mae: 0.4271  
Epoch 409/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3595 - mae: 0.4411  
Epoch 410/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3586 - mae: 0.4449  
Epoch 411/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3491 - mae: 0.4501  
Epoch 412/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3680 - mae: 0.4657  
Epoch 413/500  
7/7 [=====] - 0s 6ms/step - loss: 0.3546 - mae: 0.4532  
Epoch 414/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3341 - mae: 0.4365

Epoch 415/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3298 - mae: 0.4313  
Epoch 416/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3242 - mae: 0.4232  
Epoch 417/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3250 - mae: 0.4222  
Epoch 418/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3287 - mae: 0.4226  
Epoch 419/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3258 - mae: 0.4218  
Epoch 420/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3281 - mae: 0.4249  
Epoch 421/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3351 - mae: 0.4254  
Epoch 422/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3343 - mae: 0.4247  
Epoch 423/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3266 - mae: 0.4246  
Epoch 424/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3243 - mae: 0.4251  
Epoch 425/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3184 - mae: 0.4149  
Epoch 426/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3217 - mae: 0.4165  
Epoch 427/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3247 - mae: 0.4212  
Epoch 428/500  
7/7 [=====] - 0s 5ms/step - loss: 0.3482 - mae: 0.4433  
Epoch 429/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3484 - mae: 0.4427  
Epoch 430/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3448 - mae: 0.4344  
Epoch 431/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3395 - mae: 0.4281  
Epoch 432/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3234 - mae: 0.4183  
Epoch 433/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3296 - mae: 0.4185  
Epoch 434/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3242 - mae: 0.4193  
Epoch 435/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3794 - mae: 0.4641  
Epoch 436/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3627 - mae: 0.4678  
Epoch 437/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3773 - mae: 0.4805

Epoch 438/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3405 - mae: 0.4415  
Epoch 439/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3370 - mae: 0.4353  
Epoch 440/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3275 - mae: 0.4230  
Epoch 441/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3206 - mae: 0.4195  
Epoch 442/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3160 - mae: 0.4132  
Epoch 443/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3209 - mae: 0.4140  
Epoch 444/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3196 - mae: 0.4147  
Epoch 445/500  
7/7 [=====] - 0s 5ms/step - loss: 0.3170 - mae: 0.4127  
Epoch 446/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3267 - mae: 0.4138  
Epoch 447/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3175 - mae: 0.4096  
Epoch 448/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3112 - mae: 0.4027  
Epoch 449/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3142 - mae: 0.4024  
Epoch 450/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3140 - mae: 0.4084  
Epoch 451/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3243 - mae: 0.4225  
Epoch 452/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3330 - mae: 0.4314  
Epoch 453/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3262 - mae: 0.4295  
Epoch 454/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3180 - mae: 0.4212  
Epoch 455/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3239 - mae: 0.4267  
Epoch 456/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3194 - mae: 0.4194  
Epoch 457/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3137 - mae: 0.4148  
Epoch 458/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3120 - mae: 0.4138  
Epoch 459/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3098 - mae: 0.4135  
Epoch 460/500  
7/7 [=====] - 0s 6ms/step - loss: 0.3058 - mae: 0.4074

Epoch 461/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3044 - mae: 0.3989  
Epoch 462/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3104 - mae: 0.4037  
Epoch 463/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3276 - mae: 0.4142  
Epoch 464/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3649 - mae: 0.4586  
Epoch 465/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3592 - mae: 0.4503  
Epoch 466/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3390 - mae: 0.4310  
Epoch 467/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3129 - mae: 0.4055  
Epoch 468/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3064 - mae: 0.4042  
Epoch 469/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3123 - mae: 0.4029  
Epoch 470/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3122 - mae: 0.4039  
Epoch 471/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3107 - mae: 0.4062  
Epoch 472/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3057 - mae: 0.4029  
Epoch 473/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3052 - mae: 0.4027  
Epoch 474/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3092 - mae: 0.4113  
Epoch 475/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3126 - mae: 0.4119  
Epoch 476/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3135 - mae: 0.4064  
Epoch 477/500  
7/7 [=====] - 0s 6ms/step - loss: 0.3046 - mae: 0.4064  
Epoch 478/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3047 - mae: 0.4042  
Epoch 479/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3036 - mae: 0.4019  
Epoch 480/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3022 - mae: 0.4001  
Epoch 481/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3241 - mae: 0.4084  
Epoch 482/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3149 - mae: 0.4044  
Epoch 483/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3233 - mae: 0.4161

Epoch 484/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3266 - mae: 0.4243  
Epoch 485/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3143 - mae: 0.4151  
Epoch 486/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3275 - mae: 0.4327  
Epoch 487/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3540 - mae: 0.4495  
Epoch 488/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3164 - mae: 0.4112  
Epoch 489/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3419 - mae: 0.4381  
Epoch 490/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3236 - mae: 0.4264  
Epoch 491/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3155 - mae: 0.4201  
Epoch 492/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3020 - mae: 0.4015  
Epoch 493/500  
7/7 [=====] - 0s 5ms/step - loss: 0.3415 - mae: 0.4284  
Epoch 494/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3275 - mae: 0.4262  
Epoch 495/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3296 - mae: 0.4264  
Epoch 496/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3679 - mae: 0.4612  
Epoch 497/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3203 - mae: 0.4311  
Epoch 498/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3246 - mae: 0.4300  
Epoch 499/500  
7/7 [=====] - 0s 3ms/step - loss: 0.3055 - mae: 0.4036  
Epoch 500/500  
7/7 [=====] - 0s 4ms/step - loss: 0.3088 - mae: 0.4124  
Mean Squared Error: 1.30158269405365  
Accuracy: 0.8094167113304138